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PROVISION OF GRAIN CROP PRODUCTION SERVICES BY FARM OPERATORS: A STUDY OF OHIO FARMERS

by

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ABSTRACT

Ohio farm operators were surveyed about the proportion of selected agricultural services provided by them for their operations and the income earned from providing these services for others. The survey respondents provided more than half their tillage, crop harvesting, crop and livestock hauling, crop storage, and fertilizer and pesticide application. Excluding the latter, which stayed constant, proportion provided increased as farm size increased. Also, proportion of farm operators who provided these services for others increased as farm size increased.

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U.S. farm operators reported that they earned $653.5 million during 1978 from providing machine work, custom work, and other agricultural services (1, p. 137). This figure is 36 percent of the $1.8 billion farm operators reported paying for agricultural services (1, p. 206). Thus, farm operators are an important part of the agricultural service sector.

Despite their importance,the role of farm operators in the agricultural service sector has received the attention of only a few investigators. Isern presented a history of custom combining on the Great Plains (2). Much of his more recent data was taken from a 1971 USDA survey of 3,431 U.S. interstate custom combine crews on the Great Plains (3). Among the findings were that 91 percent of the custom combine owners were farmer-ranchers and about half earned 50 percent or more of their gross income from custom combining (3, p. iv). Lastly, Shaudys and Duvick surveyed 502 Ohio farm operators who performed custom work during 1980 (4). One of their findings was that the operators charged landlords a lower rate than other farmers, especially for custom combining (4, pp. 4 and 11).

While providing useful information, these studies focused on specific agricultural services or on farm operators who provided agricultural services. Thus, they did not address the provision of agricultural services by the universe of farm operators. On the other hand, the census contains information on aggregate

service expenses and income of farm operators but does not contain information on specific services. In addition, neither the census nor the studies addressed the provision of specific production services by farm operators for their own operations.

To address these considerations, a random sample of Ohio farm operators was surveyed about the amount of selected services they provided for their own operations and the amount of income earned from providing these services to others. In 1978, Ohio farmers who provided agricultural services earned on average $1,699 from providing services (1, pp. 137). This average is substantially less than the corresponding national average of $2,835 and hence the average for many states.[1] Differences among states reflect numerous factors including farm structure and types of crops. Thus, the survey results can be extended to the rest of the country only with care. Nevertheless, they should provide an insight into the role of farm operators in an important yet often overlooked segment of the farm production sector--the agricultural service subsector.

DATA

A random sample of 2005 Ohio farm operators was surveyed during March 1981. The sample was limited to farmers with at least 100 acres of land, both crop and noncrop, in their farming operation. This acreage limitation was selected in an attempt to limit the survey to commercial farm operators. Usable surveys were obtained from 384 farm operators, yielding a 19.2 percent response rate.

Comparison of the characteristics of respondents with the characteristics of Ohio farmers reported in the 1982 Agricultural Census revealed that large farm operators and corn, soybean, and wheat farmers were overrepresented among respondents (5). In contrast, no bias existed for livestock producers.

The surveyed farm operators were asked to indicate the percent of the following five services provided for their farming operation by them, their family members, and/or their hired employees (hereafter referred to as the on-farm labor) during the preceding 12 months: tillage, application of fertilizer and pesticide, harvesting crops, hauling crops and livestock, and crop storage. The following categories were provided: not used, none, 0.01-20.0%, 20.1-40.0%, 40.1-60.0%, 60.1-80.0%, 80.1-99.9%, and all.

The operators were also asked to indicate the amount of revenue received from providing each of the five service activities to others during the preceding 12 months. Categories were provided for each service; however, they were not structured in a way to give meaningful results, as almost all respondents who reported income from providing the service checked the category $1-5000. Therefore, the analysis was limited to whether the farmer earned income from providing the service to others.

Categories were used on the questionnaire instead of asking for a specific percent or amount because it was felt that most respondents would be able to provide only a general indication

of the percent provided or amount earned. In addition, it was felt that use of categories would increase the usable response rate.

RESULTS

While each respondent reported that at least one of the five surveyed service activities was provided for the farming operation by on-farm labor, the percent provided varied by respondent and activity. To obtain a more global perspective, an average percent provided was calculated for all respondents and for respondents grouped by census farm size categories. The averages were calculated by using the midpoint of each percent provided category and percent of farm operators who reported that category.

For all respondents the average percent provided ranged from 64 percent for crop storage to 88 percent for tillage (Table 1). Thus, as a group, the surveyed farm operators hired others to perform less than half of the five services for their operations.

As farm size increased, average percent of tillage, harvest, hauling, and storage provided by on-farm labor for the farm increased. Compared with the average percent provided by surveyed operators with 100-179 acres, the average percent provided by operators with over 1000 acres was significantly greater at the one level of confidence for all four services. In contrast, average percent of fertilizer and pesticide applied by on-farm labor basically remained constant as farm size in-

Table 1. Average Percent of Selected Activities Provided by Farm Operators, Their Family Members, and/or Their Employees on Farms of at Least 100 Acres by Farm Size, Ohio, 1980-1981.

Activity	Acres of All Land in Farm[a]					All Farm Operators
	100-179	180-259	260-499	500-999	1000+	
	(percent)					
Tillage	80.5	86.2	88.5	94.7	100.0	88.1
Application of Fertilizer & Pesticide	63.9	65.7	72.2	70.2	66.2	67.8
Harvesting Crops	69.7	74.2	82.9	91.8	98.7	80.7
Hauling Crops and Livestock	58.2	69.8	68.3	76.4	81.7	67.4
Crop Storage	56.0	52.4	68.5	73.7	80.4	64.3

[a]Number of observations varied from 89 to 104 for 100-179 acre category, from 58 to 65 for 180-259 acre category, from 87 to 93 for 260-499 acre category, from 77 to 82 for 500-999 acre category, from 23 to 24 for 1000+ acre category and from 336 to 368 for all farm operators.

SOURCE: Original Survey Data, March 1981.

creased. Therefore, on a percentage basis large farmers hired as much fertilizer and pesticide applied as small farmers but hired a smaller amount of tillage, harvesting, hauling, and storage.

For all farm sizes tillage was the service activity having the highest average percent provided by on-farm labor. This finding reflects the fact that tillage can be performed both spring and fall. This longer period of time for completing tillage operations allows both full and part-time farmers to fit tillage operations into their work schedules. Furthermore, most farm operators own a power unit(s). Therefore, since acquisition of tillage equipment generally requires only a small additional investment, capital constraints are less binding in acquiring tillage equipment compared with other farm equipment.

The finding that for most of the surveyed services small farmers provided a smaller average percent of their own needs suggests that they, on average, hired large farmers to perform agricultural services for them. This conclusion is also supported by the finding that, as farm size increased, percent of farm operators who reported income from providing each of the surveyed services for others also increased (Table 2). The Kendall's Tau C statistic between farm size and percent reporting income from providing the service for others was significant at the one percent level of confidence for each of the five services.[2] Note, the conclusion that, on average, large farmers provide agricultural services to small farmers does not imply that large farmers provide most agricultural

Table 2. Percent of Farm Operators with Farms of at Least 100 Acres Who Reported Income from Providing Agricultural Service to Others by Service and Farm Size, Ohio, 1980-1981.

Service	Acres of All Land in Farm[a]					All Farm Operators
	100-179	180-259	260-499	500-999	1000+	
	(percent)					
Tillage	3.6	7.7	13.0	23.2	17.4	11.8
Application of Fertilizer & Pesticide	4.5	7.7	6.5	13.6	20.8	8.6
Harvesting Crops	23.6	40.0	41.1	43.9	54.2	37.2
Hauling Crops and Livestock	5.5	15.4	14.9	13.8	33.3	13.2
Crop Storage	1.8	3.1	4.3	9.8	13.0	5.1

[a]Number of observations varied from 109 to 111 for the 100-179 acre category, from 64 to 65 for the 180-259 acre category, from 93 to 95 for the 260-499 acre category, from 80 to 82 for the 500-999 acre category, from 23 to 24 for the 1000+ acre category, and from 370 to 376 for all farm operators.

SOURCE: Original Survey Data, March 1981.

services hired by small farmers. Fertilizer dealers, elevators, and others may provide a greater share.

The service most provided to others was harvesting, by a substantial margin. Depending on farm size, it was followed by either tillage or hauling. The high percent of farmers who reported income from harvesting crops for others combined with the fact that 70 percent of the respondents reported doing all their own harvesting suggests that harvesting was frequently performed for landlords and not other farmers. Shaudys and Duvick found that from one-fourth to one-third of custom combining in Ohio during 1980 was performed by tenants for landlords (4, p. 5).

Both percent of farm operators who reported providing any of the services for others and average number of services provided increased as farm size increased (Table 3). Whereas only 30 percent of respondents with 100-179 acres provided at least one surveyed service for others, almost 60 percent of the respondents who farmed over 1000 acres provided at least one surveyed service for others. The Kendall's Tau C statistic between farm size and number of services provided was significant at the one percent level of confidence. This finding is consistent with the census data which reveals a positive relationship between farm size and percent of farm operators who earned income from providing services (5, pp. 72, 73, 76, and 77).

Table 3. Number of Selected Farm Activities Reported as a Source of Income by Farm Operators with Farms of at Least 100 Acres by Farm Size, Ohio, 1980-1981.[a]

Number of Services	Acres of All Land in Farm[b]					All Farm Operators
	100-179	180-259	260-499	500-999	1000+	
	(percent of farm operators)					
0	70.5	52.3	53.7	46.3	41.7	56.1
1	23.2	33.8	25.3	24.4	16.7	25.4
2	4.5	9.2	12.6	14.6	20.8	10.6
3-5	1.8	4.6	8.5	14.7	20.9	8.0
Total[c]	100.0	100.0	100.0	100.0	100.0	100.0

[a]Activities include tillage, application of fertilizer and pesticide, harvesting crops, hauling crops and livestock, and crop storage.

[b]Number of observations by farm size: 100-179, 112; 180-259, 65; 260-499, 95; 500-999, 82; 1000+, 24; and total, 378.

[c]Percents may not add to 100 due to rounding.

SOURCE: Original Survey Data, March 1981.

SUMMARY AND CONCLUSIONS

This study has investigated the farmer's role in the agricultural service sector. Among its findings were that, on average, the surveyed Ohio farm operators provided more than half of their tillage, fertilizer and pesticide application, crop harvesting, crop and livestock hauling, and crop storage. As farm size increased, the proportion of fertilizer and pesticide applied by the farm operator for his operation remained constant on average. In contrast, the proportion of the other four services provided increased as farm size increased. Lastly, percent of farm operators who reported income from providing each of the services to others and average number of services provided increased as farm size increased.

The survey findings suggest that, should the trend toward larger crop farms continue and if this cross-sectional data holds over time, elevators and other non-farm operator service suppliers may face increasing competition from farm operators. This suggestion is especially notable for the provision of crop storage and application of fertilizer and pesticide because many non-farm operators provide these services.

The study raises some interesting questions for future investigation. One is what proportion of agricultural services, in particular storage and fertilizer and pesticide application, are provided by farm operators and are the proportions increasing? A second is what impact does the existence of farm operators who provide agricultural services

have on the performance of the service sector and does the impact vary by region and/or crop enterprise? Specifically, do farmers and non-farmers price agricultural services differently? For instance, do farmers count fixed costs in their charges? The answers to the latter questions will determine in part to what extent farmers compete aggressively in and increase their share of the farm service sector.

FOOTNOTES

[1]The 1982 census data is currently available for Ohio but not for the U.S. In 1982, Ohio farm operators engaged in providing agricultural services to others earned on average $2340 from providing services (5, p 26).

[2]Kendall's Tau C was used instead of the more common correlation coefficient because income generated from providing the activities for others has only a limited number of values. For the correlation coefficient to be appropriate, both variables must be measured on an interval or ratio scale or be ordinal variables with many categories (6, pp. 223, 228, and 277).

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